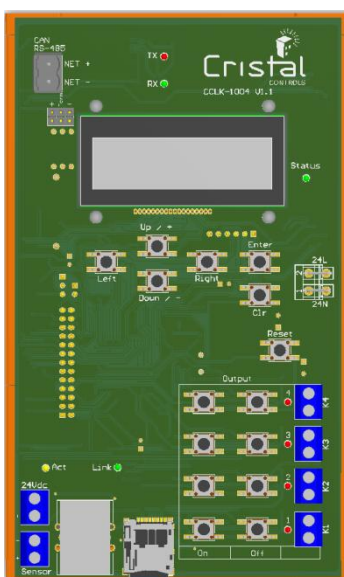


CRISTAL

CCLK-1004 3.0.0



Section 3.8 for Lux sensing

Final product may be different than the picture

2014-08-12

Martin Labbé

Cristal Contrôles Ltée
2025 Lavolsier, Local 135
Québec, (Québec) Canada G1N 4L6
Tél 418-681-9590 Fax 418-681-7393
<http://www.cristalcontrols.com>

Index

1.	General description	7
1.1.	Software algorithm.....	7
1.2.	Schedules operation	8
2.	Installation	10
2.1.	Connections	10
	WARNING: ELECTRICAL RISK.....	11
	Terminals Designation.....	11
2.2.	Sensor input (photocell).....	11
2.3.	Relays (4x).....	12
2.4.	Communication	12
	Ethernet IEEE 802.3.....	12
3.	Setting	14
3.1.	Version display	15
3.2.	Main screen	16
3.3.	Main Menu.....	16
3.4.	Menu "Schedules"	16
3.4.1.	Menu "Schedule"	17
	Output selection	18
	Output #	18

2014-08-12

CRISTAL

Cristal Contrôles Ltée
2025 Lavoisier, Local 135
Québec, (Québec) Canada G1N 4L6
Tél 418-681-9590 Fax 418-681-7393
<http://www.cristalcontrols.com>

3.4.1.1. Menu "Week"	18
This menu is to set the events for the selected output.....	18
Week	18
Day	19
Reuse	19
Events.....	19
Event edition	20
Type	20
Value	20
Time.....	21
Offset.....	21
3.4.1.2. Menu "Special"	21
Special	21
Enable	22
Edit	22
Date Edition	23
3.4.1.3. Menu "Effective Period"	23
Effective Period	23
Start Date	23
End Date.....	23

3.4.2.	Menu "Astronomic"	23
	Astronomic.....	24
	Latitude	24
	Longitude	24
	Info	24
3.5.	Clock Menu	24
3.5.1.	Menu "Date / Time"	25
3.5.1.	Menu "Daylight saving"	25
	Standard Offset	25
	DST Offset.....	25
	Start Date	26
	End Date.....	26
3.6.	Network Menu.....	26
	DHCP / automatic IP address.....	27
	IP / Address Menu	27
	Net mask Menu	27
	Gateway Menu.....	28
	Speed Menu.....	28
	MAC Address Menu	29
3.7.	BACnet Menu.....	29

2014-08-12

CRISTAL

Cristal Contrôles Ltée
 2025 Lavoisier, Local 135
 Québec, (Québec) Canada G1N 4L6
 Tél 418-681-9590 Fax 418-681-7393
<http://www.cristalcontrols.com>

BACnet Device Id Menu	29
Port / BACnet communication port	30
APDU Timeout (ms).....	30
APDU Retries	30
Object Prefix	31
Write priority	31
3.8. Lux Menu	31
3.9. Photocell Sub menu.....	31
Max Value (lux).....	32
Filter	32
3.10. Relay Sub menu	32
Setpoint On.....	33
Setpoint Off	33
Setpoint Delay	33
3.11. Menu "Reset"	34
4. Network Object	35
5. Time Zones.....	36
6. Special dates.....	38
6.1. Canadian:.....	38
6.2. United State	40

7. Dimensions.....	41
8. Material specifications.....	42
8.1. Outputs.....	42
8.2. Input.....	42

List of Figures

Figure 1 – Connections	10
Figure 2 – Input.....	11
Figure 3 – Outputs.....	12
Figure 4 – Buttons.....	14
Figure 5 – Overview of the schedule menu.....	17
Table 6 – BACnet Objects.....	35
Figure 7 – CCLK-1004 dimensions	41

1. General description

The CCLK-1004 manages 4 relays using schedules and a photocell input.

A 0-10V analog photocell can be connected on the input "Sensor". Each relay is activated based on an activation setpoint and a de-activation setpoint assisted by a time setpoint.

Schedule and photocell can be used on the same relay. Actions are performed when an event occurs; the photocell controls are performed during the transitions with a setpoint regardless of whether a command has arrived before a time or programmed after.

The CCLK-1004 uses the BACnet communication protocol. The BACnet protocol is used to read and change the status of relays, read the value of the light sensor and the 0-10V input.

1.1. Software algorithm

The CCLK-1004 software uses the value read by the "Sensor" input for the light level calculation read by the "Sensor". The maximum brightness read by the sensor (when the sensor signal is 10V) is configured to allow the calculation of the brightness level. Each relay has its own ON and OFF setpoint and a time out value.

On power up, the CCLK-1004 detects the status of each relay and launches the control sequence. The relays have a latching contact type so their status does not change on power loss. When a relay is activated (closed contact), the CCLK-1004 checks the deactivation condition. When the relay is deactivated (open contact), the CCLK 1004 checks the activation condition.

When a relay is verified for activation condition, the CCLK-1004 checks if the light level drops below the setpoint "ON" and stays there for a time equal to the set timeout value. When these conditions are met, the relay is energized (relay contact) and the CCLK-1004 starts the verification conditions for the relay off.

When a relay is verified for off condition, the CCLK-1004 checks if the light level rises above setpoint "OFF" and stays there for a time equal to the set timeout value. When these conditions are met, the relay is deactivated (open relay) and the controller will verify the conditions for activation relay.

The relays commands are shown into BACnet objects for the 4 relays. It is possible to set priority at which commands are passed to the BACnet objects using "BACnet Browser" software.

Refer to section 3.8 to 3.10 for photocell setting and section 2.2 for the installation.

1.2. Schedules operation

Any of the 4 relays can have its own weekly schedule. Every day of the week can contain up to 4 commands to apply to a relay. These 4 commands can be set at a fixed time or set according to the sunrise or sunset time.

The seven days of the week can be programmed differently. The interface let a week day to reuse the same events from another day without having to copy the contents. An eighth day name "Special" is added to the week days. This eighth day is use for exceptions of some calendar dates. The CCLK-1004 already defines several known dates and two custom date ranges can be added. It is possible to decide for each relay if the calendar dates apply or not. Example, a schedule can control the outdoor lighting

regardless of the calendar while another schedule controls indoor lighting using calendar dates.

Refer to section 3.4 to 3.5 for schedule settings.

2. Installation

The CCLK-1004 is supplied with a 35 mm (1/4") DIN-Rail enclosure.

2.1. Connections

Screw type terminals are used for connections.

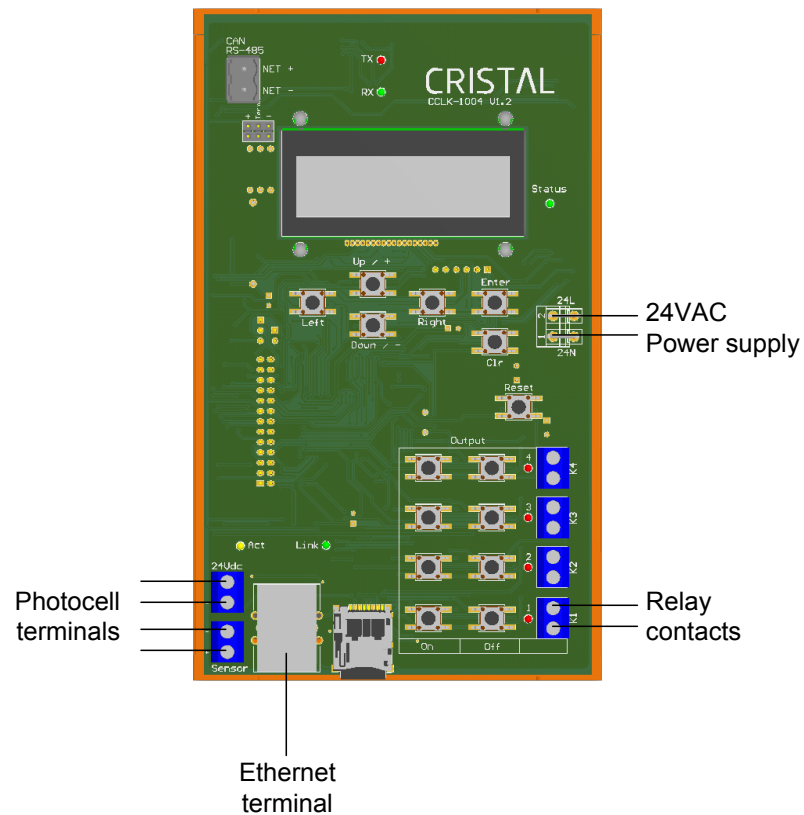


Figure 1 - Connections



WARNING: ELECTRICAL RISK

Turn off the power supply before the beginning of the installation.
Otherwise it can cause electrical shocks and damage the equipment.

Terminals Designation

K1-4	Relay contact.
Sensor	0-10 Volts photocell input.
24L	Positive supply terminal.
24N	Negative supply terminal.

2.2. Sensor input (photocell)

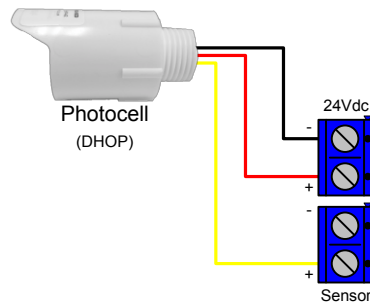


Figure 2 – Input

Non-isolated 0-10 Vdc input with a 30K Ω impedance. Use to connect the Lux sensor.

2.3. Relays (4x)

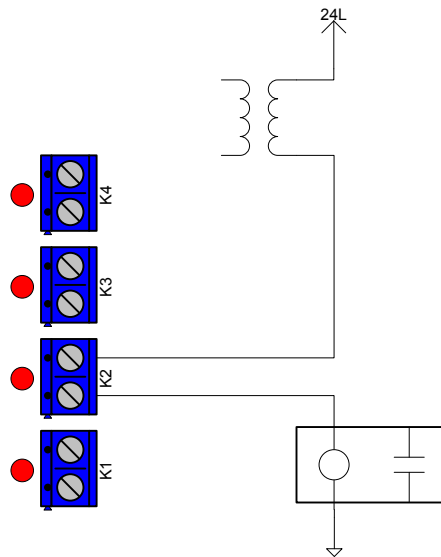


Figure 3 – Outputs

The 4 outputs are 30 Volts DC maintain contact, (1 A) low consumption. The buttons located on the left side of each relay are for relay manual operation.

2.4. Communication

BACnet IP is the communication protocol use by the CCLK-1004. This protocol allows writing and reading the 4 relays status, read the photocell value, read the 0-10 V input and set different options.

Ethernet IEEE 802.3

For BACnet-IP, the CCLK-1004 uses a standard CAT-5 unshielded twisted pair cable with an RJ-45 type connector. This is a dual speed network card with auto negotiation capability for any 10BASE-T (10 MBits) or 100BASE-T (100 MBits) connections.

The auto negotiation procedure does not mix well on 1000BASE-T (1000 Mbits) connections. In this case, the speed of the CCLK-1004 communication card, of the Network Interface Card when directly connected to a PC, or to an Ethernet switch needs to be forced at 100 Mbits or at 10 Mbits to operate properly or the Ethernet will not "link" and communication will fail.

Cable length should not exceed 100m (328 ft). If longer distances are needed, refer to a specialized network company to convert the network to alternative media such as optic fiber, DSL, or wireless.

3. Setting

The settings of the CCLK 1004 can be done using the main screen or with the Cristal Controls software name "BACnet Browser". The "BACnet Browser" software is available at:

<http://www.cristalcontrols.com/download/category.php?id=application>.

The main adjustable parameters are: setting the lux reading, setpoints or when ON and OFF will be activated. More parameters can also be set for the operation or the network communication.

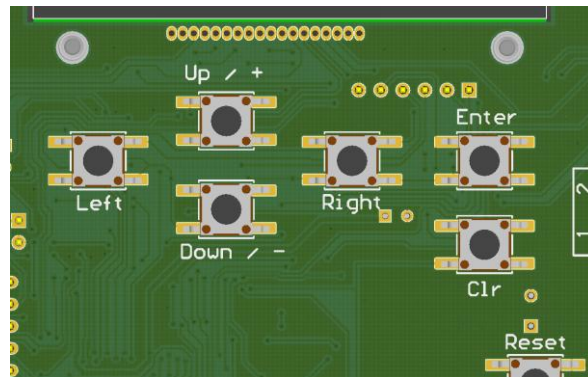


Figure 4 – Buttons

Here is how to navigate through the screen using the 6 buttons below it.

Up / +	Up in the menu selection. Increase display value. Maintain the button to scroll faster.
Down / -	Down in the menu selection. Decrease display value. Maintain the button to scroll faster.
Left	Exit a menu and return to the previous menu.
Right	Enter in the menu.
Enter	Confirmation of the new value.
Clr	Cancel the action being taken.

3.1. Version display



On power up the CCLK-1004 version is displayed for 3 seconds then the display switch to the main screen.

The version can be seen at any time using the main screen.

3.2. Main screen

```
2014-01-29 Wednesday
17:07:42 s.t.
Lux: 1234
1: ● 2: ● 3: ○ 4: ○
```

Main screen displays current time, actual Lux and relays status.

For setting modifications push on any of the 6 buttons located below the screen.

3.3. Main Menu

```
Scheduler >
Clock >
Network >
BACnet >
Lux >
Language >
Reset >
Version >
```

The main menu gives access to all sub menus. The arrow on the right ">" indicates this selection will lead to a sub-menu. Below are details of each menu.

The "Left" button sends you back to the main menu and display the CCLK-1004 actual state.

3.4. Menu "Schedules"

```
Schedule >
Astronomic >
```

The menu "Schedules" is to set events, special dates and geographical coordinates for astronomical events.

3.4.1. Menu "Schedule"

The hourly menu is to set schedules events and special dates to enable/disable the outputs.

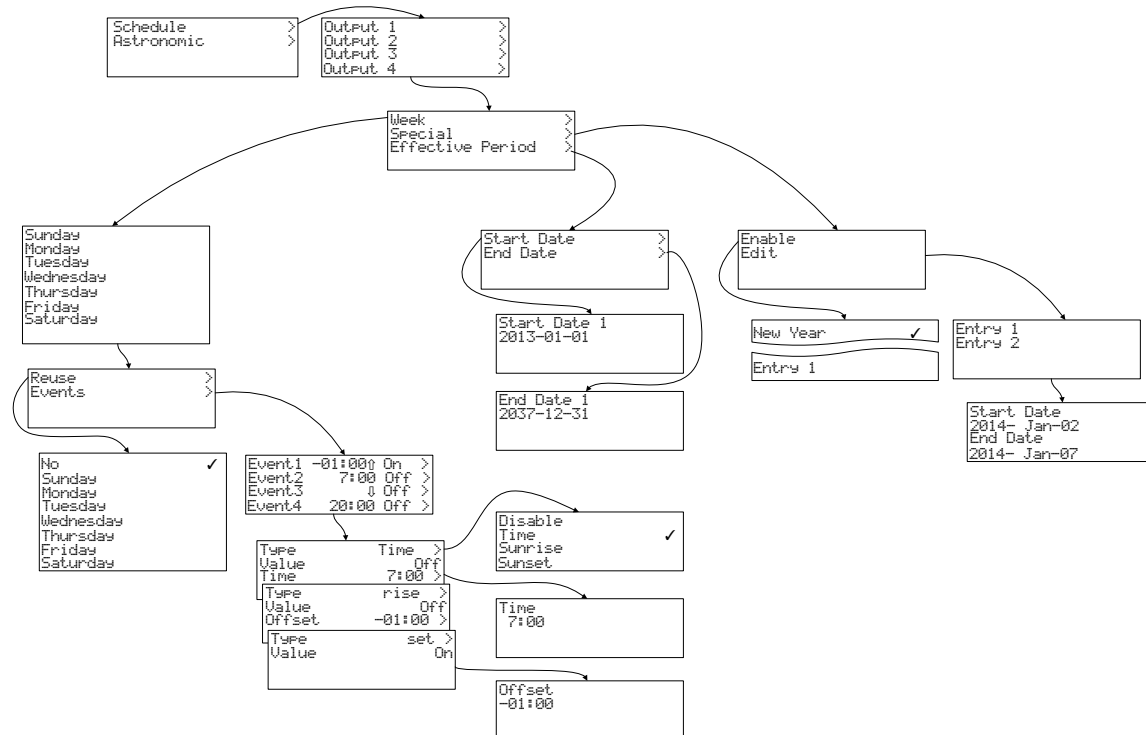


Figure 5 – Overview of the Schedule menu

Output selection

Output 1	>
Output 2	>
Output 3	>
Output 4	>

This menu allows you to select the output to be configured; the next menu will affect the selected output.

Output

Week	>
Special	>
Effective Period	>

"Week" is to set events for the selected output. "Special" is to set special days.

"Applicable period" is to set to the selected output a start date plus an end date or a schedule.

3.4.1.1. Menu "Week"

This menu is to set the events for the selected output.

Week

Sunday		>
Monday		>
Tuesday	Mon.	>
Wednesday	Mon.	>
Thursday	Mon.	>
Friday	Mon.	>
Saturday		>
Special	Sun.	>

This menu is for weekday's selection.

A day may reuse the events from another day. When day use events from another day, his name appears at the end of the line. In the example above Tuesday to Friday uses the Monday events and the special day uses the Sunday events.

Day

```
Reuse >
Events >
```

This menu allows you to choose whether the selected day uses the events of another day or set events.

Reuse

```
No ✓
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
```

This menu allows you to choose to do the same events of another day of the week without having to recopy.

Events

```
Event1 -01:00 ↑ Off>
Event2 7:00 Off>
Event3 ↓ On >
Event4 20:00 Off>
```

This menu display events and allows you to select one and modify it. Up to 4 events can be set for each of the 4 outputs. A summary of the event set is displayed. 3 types of event can be set: "Time", "Sunrise" and "Sunset".

For a "Time" event, the time is display (example "7:00").

An up arrow "↑" indicate "Sunrise" event. A down arrow "↓" indicate a "Sunset" event.

An offset to the "Sunrise" or "Sunset" event can be added (example: -01:00 ↑) the offset is indicated by an arrow. The ("On" or "Off") value is indicated at the end of the line.

Event edition

Type	Time >
Value	On
Time	7:00 >

This menu allows setting a selected event.

Type

Disable	
Time	✓
Sunrise	
Sunset	

This menu allow to choose the type of event

"Disable": is to disable the selected event (when you use less than 4 events).

"Time": event running at a specific time.

"Sunrise": Event running on Sunrise. An offset can be added to Sunrise,

"Sunset": Event running on Sunset. An offset can be added to Sunset.

Value

Value	Off
-------	-----

Value of "On" or "Off" event.

Time

```
Time
7:00
```

Fix Time of the "Time" event.

Offset

```
Offset
-01:00
```

Time offset apply to "Sunrise" or "Sunset".

3.4.1.2. Menu "Special"

This menu allows you to configure special days for the selected output. A common events calendar of is already programmed into the clock .Two fixed dates can be added.

Special

```
Enable
Edit
```

Enable

New Year	✓
January 2	
Family Day BC	
Family Day	
Heritage Day YT	
Saint-Patrick NL	
Good Friday	
Easter	
Easter Monday	✓
(...)	
Thanksgiving US	
Black Friday	
Entry 1	✓
Entry 2	

Excepted for "Entry 1" and "Entry 2", these dates can't be modified. This menu enables or disables special days defining when the "Special" weekday will be effective. See section "Special dates" for date setting in Entry 1 and Entry 2.

Edit

Entry 1	>
Entry 2	>

This menu allows modifying a selected date.

Date Edition

```
Start Date
2014- Jan-02
End Date
2014- Jan-07
```

Allows setting a date range.

3.4.1.3. Menu "Effective Period"

This menu allows you to configure a start and end date when the schedule for selected output will be effective on relays.

Effective Period

```
Start Date    >
End Date      >
```

Start Date

```
Start Date
2013-01-01
```

End Date

```
End Date
2037-12-31
```

3.4.2. Menu "Astronomic"

The "Astronomical" menu allows you to configure the geographical location where the clock is installed in order to calculate the times of astronomical events.

Astronomic

```
Latitude
Longitude
Info
```

Latitude

```
Latitude
46
```

Latitude configuration: A negative value indicates the South.

Longitude

```
Longitude
-71
```

Longitude configuration: A negative value indicates the West.

Info

```
Today sunrise
2014-01-29 07:07:00
Today sunset
2014-01-29 16:45:00
```

This screen display Sunrise and Sunset time for that day.

3.5. Clock Menu

```
Date / Time      >
Daylight saving  >
```

3.5.1. Menu "Date / Time"

```
Date / Time
2014-01-29 17:07:42
Wednesday
```

```
Date / Time
2014-11-29 17:07:42
Wednesday
```

Clock time is displayed; using the "Right" or "Enter" buttons it highlights the number ready for modification. All these values can be replaced one by one and on confirmation a validation will be done.

3.5.2. Menu "Daylight saving"

```
Standard Offset  >
DST Offset      >
Start Date      >
End Date        >
```

The "Time zones" section contains Canadian and US time zones input values.

Standard Offset

```
Standard Offset
-05:00
```

This screen configures the offset from UTC to standard time.

DST Offset

```
DST Offset
-04:00
```

This screen configures the offset from UTC to daylight saving time.

Start Date

```
Start Date
Month: March (3)
Week: 2nd (2)
Day: Sunday (0)
```

This screen sets the start date used to start applying daylight saving time calculation. In the example the start date is the second Sunday of March.

End Date

```
End Date
Month: November (11)
Week: 1st (1)
Day: Sunday (0)
```

This screen sets the end date used to return to normal time. In the example the end date is the first Sunday of November.

3.6. Network Menu

```
DHCP          Off
IP             >
Netmask       >
Gateway       >
Speed         >
MAC           >
```

The "Network" menu is to set the IP network parameters. Skip this menu if the CCLK-1004 is not connected to an IP network.

DHCP / automatic IP address

The network will automatically assign using this parameter an IP address. When this option is ON, it can be useful when testing without causing addressing IP address conflict.

The default value is OFF and communications settings are done manually. Manual settings ensure that the communication would be functional in the absence of a DHCP server.

***Network administrator shall confirm network settings.**

IP / Address Menu

```
IP
192.168.  2. 99
```

Current CCLK-1004 IP address is displayed. Use the buttons to replace numbers.

Net mask Menu

```
Netmask
255.255.255. 0
```

Actual CCLK-1004 communication Net mask is displayed.

Use the buttons to replace numbers.

Gateway Menu

```
Gateway
192.168.  2.  1
```

CCLK-1004 gateway address. Use the buttons to replace numbers.

This address is usually the same as the Internet router of the network.

Speed Menu

```
Full 100 Mbit    ✓
Half 100 Mbit
Full  10 Mbit
Half  10 Mbit
Auto
```

This menu is to set the Ethernet network speed. The "✓" indicate the actual speed. This number shall be the same as the device connected at the other end of the network.

"Full" means "Full duplex", the network can send and receive at the same time. "Half" means "Half duplex", the network cannot send at the same time it receives. The "10" and "100" indicate the communication speed in Megabits per second. The "Auto" mode let the CCLK-1004 choose the communication speed. The "Full 100 Mbit" is suggested since the "Auto" mode is not compatible with devices using 1 Gigabit per second are on the same network.

MAC Address Menu

```
MAC
00:50:C2:90:70:FE
```

This menu displays the CCLK-1004 MAC address. The MAC address can be replaced on the initial CCLK-1004 setting.

3.7. BACnet Menu

```
Device Id      >
Port           >
APDU Timeout (ms) >
APDU Retries   >
Object Prefix  Off
```

This menu is for the BACnet communication settings.

The BACnet network administrator will indicate the exact values.

Skip this section if the CCLK-1004 does not communicate with other BACnet devices.

BACnet Device Id Menu

```
Device Id
12345
```

This menu is to set the CCLK-1004 BACnet device Id. This number must be unique on the network and shall be between 0 and 4194302.

Port / BACnet communication port

```
Port  
47808
```

This menu is to set the CCLK-1004 BACnet IP communication port. Default value is 47808 or in hexadecimal BAC0.

APDU Timeout (ms)

```
APDU Timeout (ms)  
3000
```

APDU Timeout parameter specifies the time in milliseconds between retransmissions of a message for which no confirmation has been received.

It is suggested that all devices have the same value. Default value is 3000ms.

APDU Retries

```
APDU Retries  
3
```

APDU Retries parameter specifies the maximum number of times a message must be retransmitted. The default value is 3.

Object Prefix

Object Prefix	Off
---------------	-----

Using this configuration "On" or "Off", it enables or disables the use of BACnet "device" object name as prefix to each controller object. The use of a prefix eases the objects identification upon some software. Default value is "Off".

Write priority

Write Priority	8
----------------	---

Indicates the BACnet priority used to write the output status. Default value is 8.

3.8. Lux Menu

Photocell	>
Output 1	>
Output 2	>
Output 3	>
Output 4	>

This menu gives access to the "Photocell" and "Output #" sub menus to set Lux functionalities.

3.9. Photocell Sub menu

Max Value (lux)	>
Filter	>

This sub menu is for the Lux sensor settings.

Max Value (lux)

```
Max Value (lux)
771
```

This menu set the Lux read by the Lux sensor. This is the Lux reading given for the full-scale 10 Volts signal.

The signal read by the controller CCLK-1004 is linear and proportional to Lux calibration data in this screen.

Filter

```
Filter (s)
10
```

This menu allows setting a numerical filter (in second) to the lux reading. This parameter allows you to reduce the reading fluctuations on the sensor signal.

3.10. Output # Sub menu

```
Setpoint On      >
Setpoint Off     >
Setpoint Delay   >
```

This menu allows ON-OFF setting of the relays base on Lux reading. The menu is identical to all relays but the setting could be different for each relays to ease zoning sequences.

Setpoint On

```
SetPoint On (lux) 1  
20
```

This menu allows setting parameters for an "On" command. When Lux reading is greater than this setting and drop below it, the relay goes "On". If this value is "0" the "On" command is then deactivated for this relay.

Setpoint Off

```
SetPoint Off (lux) 1  
200
```

This menu allows setting parameters for an "Off" command. When Lux reading is greater than this setting and increase above it, the relay goes "Off".

If this value is greater than the Lux setting the "Off" command is deactivated for this relay.

Setpoint Delay

```
SetPoint Delay (s) 1  
600
```

This menu allows setting "On" or "Off" transitions time; this sets a delay eliminating temporary transitions when the signal flickers around its setpoint.

Example: With a 600 seconds (10 minutes) time, the ("On" or "Off") transition need to be maintained for 10 minutes before the command is sent to the relay.

3.11. Menu "Reset"

```
Cancel  
Delete all schedules
```

This menu allows you to reset the configurations schedules. Hold down the "Right" or "Enter" button for 5 seconds to clear schedules. Once the configurations are erased, the device restarts.

It is possible to reset all configurations. Press the "Reset" and hold the "Left" and "Right" buttons for 5 seconds.

4. Network Objects

The CCLK-1004 has different type of BACnet objects. Details are in the chart below:

Object	Description	Value	Value type	Default value	Object type
CCLK-1004	CCLK-1004 information	-	-	-	Device
PHOTOCELL	Input Value "Sensor"	Unsigned integer	Lux	0	Analog input
IN 0-10V	Input value "In 0-10 V"	0-100%	Percentage	0	Analog input
RELAY CMD N	Relay N (N : 1 à 4)	ON or OFF	Boolean	-	Binary Output
RELAY FB N	Relay N (N : 1 à 4)	ON or OFF	Boolean	Relay state upon the controller	Binary Input
CCLKCfg.bin	Controller settings CCLK-1004	-	-	-	BACnet file
SchedulerCfg. bin	Schedules configuration	-	-	-	BACnet file
SCHEDULE N	Schedule object for relay N	-	-	-	Schedule (1)

Table 6 – BACnet Objects

- 1 Note for the "Schedule" objects: they are not writable. Only the types of events available in the BACnet protocol are shown. Astronomical events and some special days such as Easter are not visible by this object.

5. Time Zones

Canadian and US time zones, the summer offset date is the first November Sunday. The end date is second March Sunday.

Name	UTC Offset	UTC summer Offset
Canada/Atlantic	-04:00	-03:00
Canada/Central	-06:00	-05:00
Canada/Eastern	-05:00	-04:00
Canada/Mountain	-07:00	-06:00
Canada/Newfoundland	-03:30	-02:30
Canada/Pacific	-08:00	-07:00
Canada/Saskatchewan	-06:00	-06:00
US/Alaska	-09:00	-08:00
US/Aleutian	-10:00	-09:00
US/Arizona	-07:00	-07:00
US/Central	-06:00	-05:00
US/East-Indiana	-05:00	-04:00
US/Eastern	-05:00	-04:00

US/Hawaii	-10:00	-10:00
US/Indiana-Starke	-06:00	-05:00
US/Michigan	-05:00	-04:00
US/Mountain	-07:00	-06:00
US/Pacific	-08:00	-07:00
US/Samoa	-11:00	-11:00

6. Special dates

List of fix specials dates

6.1. Canadian:

Nom	Date
New Year	January 1
January 2	January 2
Family Day BC (British Columbia)	Second Monday in February
Family Day	Third Monday in February
Heritage Day YT (Yukon)	Friday before the last Sunday in February (Friday after February 19) Note: Valid until 2031
Saint-Patrick NL (Newfoundland and Labrador)	Monday closer to Mars 17 (Monday after Mars 13)
Good Friday	Friday before Easter
Easter	Easter
Easter Monday	Monday after Easter
Saint-George	Monday closer to April 23

	(Monday after April 19)
Victoria Day	Monday before May 25
Aboriginal Day	June 21
Discovery Day NL (Newfoundland and Labrador)	Monday closer to June 24 (Monday after June 20)
St-Jean-Baptiste (Quebec)	June 24
Canada Day	July 1
Nunavut Day	July 9
Orangemen Day	Monday closer to July 12 (Monday after July 8)
Civic Holiday	First Monday of August
Discovery Day YT (Yukon)	Third Monday of August
Gold Cup Parade Day	Third Friday of August
Labour day	First Monday of September
Thanksgiving CA (Canada)	Second Monday of October
Remembrance Day (Same as US Veteran Day)	November 11
Christmas Eve	December 24

Christmas	December 25
Boxing Day	December 26
December 31	31 December

6.2. United State

Nom	Date
Martin Luther King	Third Monday of January
Washington Birthday	Third Monday of February
Memorial Day	Last Monday of May
Independence Day	July 4
Labor Day (see Labour Day above)	First Monday of September
Columbus Day	Second Monday of October
Thanksgiving US	Fourth Thursday of November
Black Friday	Fourth Friday of November

7. Dimensions

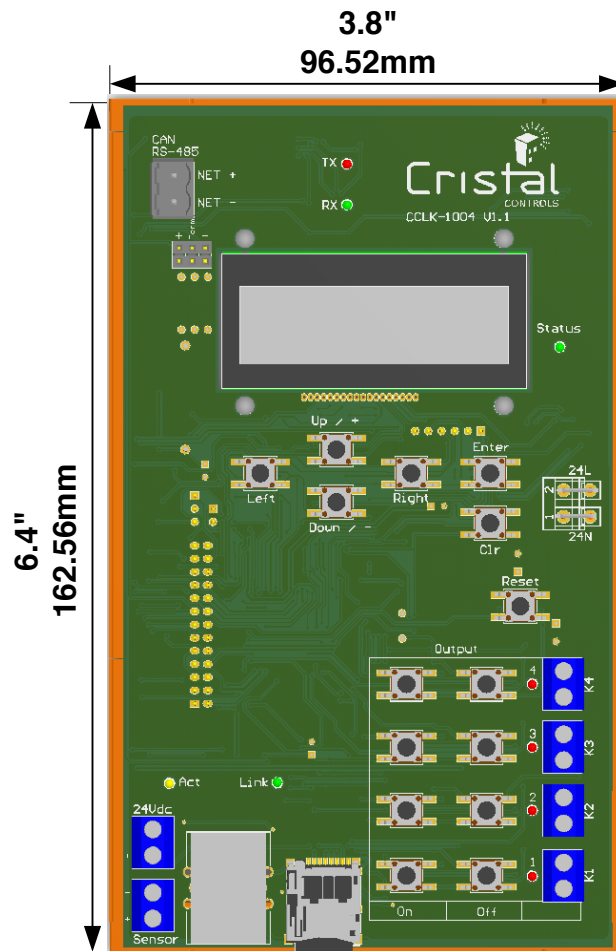


Figure 7 – CCLK-1004 dimensions

8. Material specifications

- Microcontroller : Freescale MCF52235
- Communication: TCP/IP BACnet IP
- Supply Voltage : 18 – 28 Vac "Half Wave"
- Supply Current: 180 mA, 220 mA max
- Operating temperature: 0°C à 50°C (32°F à 122°F)
- Storage temperature: -20°C à 70°C (-4°F à 158°F)
- EEprom memory – recording configuration: 512 bytes, 1 000 000 writing cycle

8.1. Outputs

- 4x Dry contact: 1A @ 24Vac / 30Vdc

8.2. Input

- 1x 0–10Vdc analogic impedance of (30K Ω)

Legal Disclaimer

Any representation or reproduction, in whole or in part, made without the permission of Cristal Controls Ltd, is unlawful. Such unlawful representation or reproduction, made by any means, would be an infringement of copyright punished under the provisions of the copyright law. All products are registered trademarks of their respective companies.

This product uses portions of code source from the projects "BACnet Stack at SourceForge" and "OpenTcp by [Viola Systems](http://viola-systems.com)". The original source code can be provided on demand or downloaded on the projects' web sites at the following addresses: <http://bacnet.sourceforge.net> and <http://sourceforge.net/projects/opentcp/>.

© Cristal Controls Ltd – All Rights Reserved 1996 – 2014

CRISTAL

Cristal Contrôles Ltée
2025 Lavoisier, Local 135
Québec, (Québec) Canada G1N 4L6
Tél 418-681-9590 Fax 418-681-7393
<http://www.cristalcontrols.com>

2014-08-12

CRISTAL

2 YEAR LIMITED WARRANTY

CRISTAL CONTROLS warrants to the original user that its products will be free from defects in materials and workmanship for a period of two years after the date CRISTAL CONTROLS shipped such products.

If any of CRISTAL CONTROLS' products is found to be defective in material or workmanship during the applicable warranty period, CRISTAL CONTROLS' liability shall be limited to the repair or replacement of the product, or the refund of the purchase price, at CRISTAL CONTROLS' discretion. CRISTAL CONTROLS shall not be held liable for any costs or expenses, whether direct or indirect, associated with the installation, removal or re-installation of any defective product.

CRISTAL CONTROLS' limited warranty shall not be effective unless there is compliance with all installation and operating instructions furnished by CRISTAL CONTROLS, if the products have been modified or altered without the written consent of CRISTAL CONTROLS, or if such products have been subject to accident, misuse, mishandling, tampering, negligence, or improper maintenance. Any warranty claim must be submitted to CRISTAL CONTROLS in written form within the stated warranty period.

CRISTAL CONTROLS' limited warranty is made in lieu of, and CRISTAL CONTROLS disclaims all other warranties, whether expressed or implied, including but not limited to any implied warranty of the products.

CRISTAL CONTROLS shall not, under any circumstances, be liable for any direct, indirect, accidental, special, or consequential damage (including but not limited to loss of profits, revenues, or business opportunities) or damage or injury to persons or property in any way related to the manufacture or the use of its products. The exclusion applies regardless of whether such damages are sought based on breach of warranty, breach of contract, negligence, strict liability in tort, or any other legal theory, even if CRISTAL CONTROLS was noticed of the possibility of such damages.

By purchasing CRISTAL CONTROLS' products, the purchaser agrees to the terms and conditions of this limited warranty.